

## ENERGY STAR HVAC Quality Installation An Opportunity for Program Savings

Governor's Energy Advisory Committee June 25, 2008

Presented by Ted Leopkey, ENERGY STAR Residential Branch <u>Leopkey.ted@epa.gov</u> or 202-343-9659

## Why EPA is Involved?



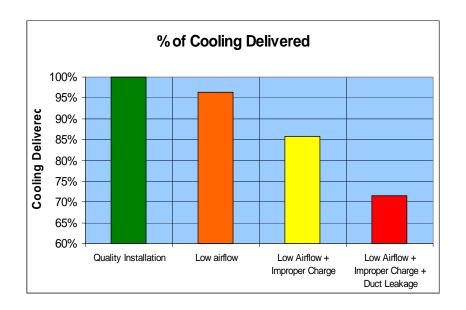
- Studies show that half of all air conditioners in U.S. homes perform poorly due to one or more installation issues.
- Raise consumer awareness on the importance of QI and meet expectations
- > The ENERGY STAR Brand can influence consumer choices
- NAECA SEER requirements have reduced the energy savings potential from promoting high-efficiency equipment. The ENERGY STAR HVAC QI program provides an opportunity for additional kW and kWh savings.

# Potential Losses Caused by Poor Installation



- Air Flow over Indoor Coil
  - > (70% inadequate)
- > Refrigerant Charge
  - (62% improperly charged)
- Equipment Sizing
  - > (50% oversized)
- Duct Leakage is significant
  - (Total leakage averaged 35% in the pilots)





Installation issues may reduce capacity by up to 30 percent!

Or put another way...

a SEER 13 performs like a SEER 10

# **Estimated Energy Savings**



	Per House
Annual energy savings (KWh)	1300 - 1900 kWh
Estimated peak electricity demand savings (KW)	1 - 1.3 KW

#### Assumptions:

New system corrects typical install problems

- •Duct leakage reduced from 35% to 20%
- •Duct insulation increased from R2 to R6
- Proper charge
- Proper airflow
- Proper sizing

## **Barriers to Market Correction**



- Consumers do not know their performance is low (If cold air is blowing they don't usually complain)
- ➤ Consumers are unaware that improper installation affects efficiency and comfort (view HVAC similar to an appliance)
- > Technicians rely on "rules of thumb"
- ➤ "Time is money" business model
- Manufacturer's are willing to absorb warranty claims for units that have failed because of installation issues

## ENERGY STAR HVAC QI Guidelines



- Installations under the program must meet the ANSI/ACCA HVAC Quality Installation Specification
- The QI Specification identifies consensus requirements associated with quality installations.



2800 Shirlington Road Suite 300 Arlington, VA 22206 703.575.4477 Fay 703.575.8107

cca.org

ACCA Standards are updated on a five-year cycle. The date following the standard number is the year of approval release by the ACCA-BE Standards. Task Team. The latest copy may be purchased from the ACCA online store at www. accasing or ordered from the ACCA books to reven the latest copy and the standard of the accase of the standard of the ACCA books to red to the standard of t



#### **ACCA Standard**

STANDARD NUMBER: ANSI/ACCA 5 QI-2007

## HVAC Quality Installation Specification

Residential and Commercial Heating, Ventilating, and Air Conditioning (HVAC) Applications

The Air Conditioning Contractors of America Educational Institute (ACCA-EI) Standards Task Team (STT) develops standards as an American National Standards Institute (ANSI) accredited standards developer (ASD), ACCA develops voluntary standards as outlined in the ACCA Essential Requirements and the ANSI Essential Requirements. ACCA standards are developed by diverse groups of industry volunteers in a climate of openness, consensus building, and lack of dominance (e.g., committee/group/team balance). Essential requirements, standard activities and documentation can be found in the standards portion of the ACCA website at www.acca.org. Questions, suggestions, and proposed revisions to this standard can be addressed to the attention of the Standards Task Team, ACCA, 2800 Shirlington Road, Suite 300, Arlington, VA 22206.

### Verification



#### **Level 1 Verification:**

Data review of Manual J calculations and commissioning report. The data review will include confirming that all required installation elements were performed using an approved method and check for data inconsistencies

#### **Level 2 Verification:**

In-field verification of the installation that follows established protocols.

ENERGY STAR in Cooperation with TXU Electric Delivery				
Installation Pilot Commissioning Report				
	Tim	e:		
Site Information				
Address 1:				
City:		State:	Zip:	
Design				
	Manual J v7 Manual J v8			
_	Manual D None			
Equipment Specification method:	Manual S OEM Recomm	mendation Other (specify):		
Latent Heat Gain:	BTUh	Sensible Heat Gain:	BTUh	
Total Heat Gain:	BTUh	Design Airflow:	CFM	
Duct Design Static Pressure:	IWC			
Type of Installation: Replacement New System - Existing Home New System - New Home				
Square Feet of Zone:				
Equipment				
Condenser: Manufacturer:		Model:		
Evaporator: Manufacturer:		Model:		
· ·				
System				
Metering Device:	TXV Rived Orifice	Other (specify):		
Refrigerant		Other (specify):		
Refrigerant Charge Goal (for TXV):	Subcooling	Approach @or Lennox	only)	
Fan Motor Type	Fixed Speed (e.g. PSC)	Variable (e.g. GE - ECM)		
Latent Capacity:	BTUh	Sensible Capacity:	BTUh	
Total Capacity:	BTUh			
		ARI Ref #:		
Air Flow Tests				
Static Pressure	Patura Static	IWC Supply Static	IWC	
Measured Air Volume @ evaporator:		Supply Static		
Volume Measurement Method Used:		Description (and Durch Binds and	Other:	
Evaporator/Air Handler Fan Power: Pre		volts	U Other: watts	
	Amps	volts	watts	
	Amps	volts	watts	
	Amps	volts	watts	
	Amps	volts	watts	
	Amps	volts	watts	
Speed Setting		-Low Med Med-High High CFN		
>>> OR <<<<				
Speed Setting:	: Variable: Fan set f	for: CFM		

Please mail completed forms to: Siobhan Steyn at The Cadmus Group Inc., 57 Water St, Watertown, MA 0247 or fax: (617) 673-7310 or email: ssteyn@cadmusgroup.com

## Partner with ENERGY STAR



- > Implementation guide
- Marketing material
- Sample commissioning and verification reports
- Certificate
- Training for participating contractors
- Well known Energy Star brand



Installation Pilot Commissioning Report	Installation Plot Commissioning Report (Page 2)
Site Informations  Date 3.42002 Time 5.58:05 FM	Test Conditions
Address 1 Address 2 City State 2er	Topply 65 T DD Supply 64 P HD Address of Supply 64 P HD Address of Supply 64 P HD Address of Supply 64 P HD Address or Sup
Station Station Denutre Denutre Done Control	Upat Lin Pressure pe Upat Conform F Sudon Lin Pressure pe Sudon Lin Form F
Dud Dudge Matted Check Deve Other Specify  Equipment Specification method Check S Collectioned time Collection	Rehigerant Coloulations Condensing Terre-Fronts panel
Latent Host Calor. BTUb Seesible Host Color. BTUb Total Heat Calor. BTUb Design Article: CYM	Expending Temp-tem-schol proci Facilities Spherical Community Fore-scalar Line
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Minutenare State Serial Number	Approach Decision (supress (set -taproac)
Noting Device:   fir	System Cattable  Hash ACOLOG SP Dire: UNe  Une  System Cattable  Hash ACOLOG SP Dire: Une
Petitigerant Charge Good (for ToV) Subcooking Approach (or Lamous regill Facilitation Type: Three Speed (eq. PEQ Densité in 6, 601-604)	Duct Leitage
Later Coposity ETUS Sensible Coposity ETUS Total Coposity ETUS APPLEASED (10 to bujue) APPLEASED	Coding system Dect sample
Air Frie Fests Static Pressure: Finance Static	System Decembration.  Dipper of the spectrum CSF immurps left with never   Me   Me   Decembration System for sever   Me   Me   Decembration System for sever   Me   Me   Me   Decembration System for sever   Me   Me   Me   Me   Me   Me   Me
Monared Air Vision of exposition: ONE Construction Constr	Indicate Nate Corpore Addiss 1 Addiss 2
Speed Setting Variable Fair set bit (CFH	CMy State Zp